

What is claimed is:

1. A method of mixing two or more dissimilar fluids comprising the steps of:
  - (a) introducing one fluid into the other to form a mixture;
  - (b) inducing cavitation in the mixture to reduce at least one of the fluids to a large number of relatively small units; and
  - (c) distributing the small units uniformly throughout the mixture.
2. A method of mixing two or more dissimilar fluids as claimed in claim 1 and wherein at least one of the fluids is a gas and where in step (b) the gas is reduced by the induced cavitation to a large number of relatively small bubbles.
3. A method of mixing two or more dissimilar fluids as claimed in claim 2 and wherein one fluid is oxygenated by the gas.
4. A method of mixing two or more dissimilar fluids as claimed in claim 2 and wherein a component within the mixture is oxidized by the gas.

5. A method of mixing two or more dissimilar fluids as claimed in claim 1 and wherein the fluids are liquids and wherein the method results in emulsification of the liquids.

6. A method of mixing two or more dissimilar fluids as claimed in claim 1 and wherein one of the fluids is an emulsion and wherein the method results in separation of the emulsion into its constituent components.

7. A method of mixing two or more dissimilar fluids as claimed in claim 1 and wherein one of the fluids is a liquid having suspended particles and wherein another one of the fluids is a gas, the method resulting in dissolved air floatation of the particles to separate the particles from the liquid.

8. A method of mixing two or more dissimilar fluids as claimed in claim 1 and wherein one of the fluids is a heated gas and another one of the fluids is a liquid, the method resulting in a transfer of heat from the heated gas to the liquid.

9. A method of mixing two or more dissimilar fluids as claimed in claim 1 and wherein step (b) comprises introducing the mixture into a chamber having a rotating disc formed with a plurality of irregularities, the irregularities on the rotating disc inducing cavitation within the mixture.

10. A method of mixing two or more dissimilar fluids as claimed in claim 9 and wherein the irregularities on the rotating disc are bores formed in the disc.

11. A method of mixing two or more dissimilar fluids as claimed in claim 10 and wherein the disc has a periphery and wherein the bores are formed in the periphery of the disc.

12. A method of oxidizing a molecular compound within a fluid comprising the steps of:

(a) introducing an oxidizer into the fluid to create a mixture;

(b) inducing cavitation within the mixture to reduce the oxidizer into a large number of relatively small units for maximizing the total surface area of the oxidizer in contact with the fluid; and

(c) distributing the units of oxidizer uniformly throughout the fluid to enhance the probability of contact between the oxidizer and the molecules of the molecular compound.

13. A method of oxidizing a molecular compound within a fluid as claimed in claim 12 and further comprising the step of breaking the van der Waals attractions between molecules in the fluid to enhance further the probability of contact between the

oxidizer and molecules of the molecular compound within the fluid.

14. A method of oxidizing a molecular compound within a fluid as claimed in claim 13 and wherein the step of breaking the van der Waals attractions comprises subjecting the fluid to the cavitation induced in step (b).

15. A method of oxidizing a molecular compound within a fluid as claimed in claim 9 and wherein the fluid is a fuel to be burned and wherein the molecular compound, when not oxidized, generates environmental toxins upon burning of the fuel.

16. A method of oxidizing a molecular compound within a fluid as claimed in claim 15 and wherein the fluid is black liquor.

17. A method of oxidizing a molecular compound within a fluid as claimed in claim 16 and wherein the molecular compound is Sodium Sulfide.

18. A method of oxidizing a molecular compound within a fluid as claimed in claim 17 and wherein the oxidizer is oxygen.

19. A method of oxidizing a molecular compound within a fluid as claimed in claim 18 and wherein step (a) comprises introducing air into the black liquor, the air containing oxygen.

20. A method of mixing a gas and a liquid comprising the steps of introducing the gas into the liquid to create a mixture and moving the mixture through a cavitation zone wherein cavitation is induced in the mixture to reduce the gas to microscopic bubbles.

21. A method of mixing a gas and a liquid as claimed in claim 20 and further comprising distributing the microscopic bubbles of gas uniformly throughout the liquid.

22. A method of mixing a gas and a liquid as claimed in claim 21 and further comprising breaking van der Waals attractions between molecules within the liquid to enhance the mixing of the gas with the liquid.

23. A method of mixing two or more dissimilar fluids as claimed in claim 1 and wherein one of the fluids is a fuel and another one of the fluids is a gas, the method resulting in atomization of the fuel for enhanced burning efficiency.